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THE MAGNAVOX COMPANY, et al.,

Plaintiff,

vs.

CHICAGO DYNAMIC INDUSTRIES
and SEEBURG CORP.,

Defendants.

No. 74 C 1030
and
74 C 2510

BEFORE: Honorable JOHN F. GRADY, a Judge.

Thursday, January 6, 1977

2:00 o'clock p.m.

FILED

MAR 2 - 1977

PRESENT:

MR. ANDERSON
MR. WILLIAMS

MR. GOLDENBERG
MR. RIFKIN

H. Stuart Cunningham, Clerk
United States District Court

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MR. GOLDENBERG: Your Honor, I would like to offer Defendants' Exhibit 30, biographical information with respect to Arthur Holt (tendering document to Court).

THE COURT: Very well. Thank you.

ARTHUR W. HOLT,

called as a witness by the defendants herein, having been previously duly sworn, resumed the stand, was examined and testified further as follows:

DIRECT EXAMINATION (resumed)

BY MR. GOLDENBERG:

Q I would like to return one moment, sir, to your qualifications, and I note in your biographical information it is indicated that you are a Fellow of the IEEE. Could you first state what the IEEE is.

A The IEEE -- I triple E, we call it -- is the Institute of Electrical and Electronic Engineers. It was formed by a combination of the AIEE and the IRE.

Q Could you tell us what those initials meant, sir?

A Sir?

Q Could you tell us what those initials meant?

A Oh, Institute of Radio Engineers was the IRE, which was essentially the engineering society which for many, many years has been the place where electronics people gathered, as opposed to the AIEE, which was where the electric engineers gathers.

Holt - direct

Q What does it mean that you are a Fellow of that organization?

A That is an honorary elected position, and I was elected to that post after having been proposed and various people had to say what useful things I had done. They said nice things about me.

Q That is something different than being an ordinary member of that organization?

A Yes, sir, you have to be put up for that by other Fellows, other people who have been elected to that grade.

Q I would like you to turn again to Fig. 3 of the '480 patent, and with reference to that figure, could you state the similarities and differences between what is shown in that figure and Fig. 12A of the '598 patent, as represented in Plaintiff's Exhibit 90?

A You have the '598 drawing and you want to compare that with Fig. 3 of the '480?

Q That's correct.

A I see a wall generator in Fig. 12A of '598 up there, which does not occur in Fig. 3 of '480.

Q Could you tell all the differences and similarities that you see?

A We also see, of course, a primary flip-flop.

Well, the similarities are that we have the vertical synchronization generator, the horizontal synchroni-

Holt - direct

zation generator. We have Dot 1 and Dot 2 generator. Those are in yellow. Those all occur in Fig. 3 of '480.

We also have a dot coincidence detector, which occurs in both of them.

We have the equivalent of the summing amplifier modulator and RF oscillator. Those are all there.

The primary and secondary flip-flops shown in Fig. 12A of '598 do not occur in the block diagram of Fig. 3 of '480 nor does the wall generator.

Q I am sorry, what was the last?

A The wall generator appears in '598. It does not appear in Fig. 3 of '480.

Q Is there anything like the Dot 3 ball generator in the '480?

A No, that is not in the '480 either.

Q Could you state then the differences between the disclosure of the '480 patent and the elements of the '598 patent as shown in Fig. 12A, as you understand it, putting it in terms of functional capability of the two circuits?

A Functionally the drawing Fig. 12A of '598 shows the following differences over Fig 3 of '480. There are three dot generators, and functionally this is quite different because we can now have two paddles and a ball. This is that part, of course, being taught by '507.

The primary and secondary flip-flops have

Holt - direct

an important part to play in enabling the hit spot and the hitting spot to work. The wall generator is the main difference between the '598 and the '507.

Q Is there anything like the primary and secondary flip-flops in the '507 patent?

A Yes, sir, I think they are quite equivalent there. 122, called the flip-flop, I believe really is equivalent to 104 in the '598 picture, called primary flip-flop.

Going back to the '507 picture, the slow free running flip-flop, I believe, is equivalent -- well, it is used for serving, as I understand it, and would be equivalent to the secondary flip-flop of the drawings for '598.

THE COURT: I am sorry. I am not sure I followed that.

What in the '507 is is equivalent to the wall generator in '598?

THE WITNESS: There isn't, sir.

THE COURT: I see. What was it you just said was the equivalent?

THE WITNESS: In both cases they have a flip-flop which reverses the ball motion, in both '507 and '598, and they have another flip-flop which serves the ball if it gets missed by one of the players.

THE COURT: All right, thank you.

BY MR. GOLDENBERG:

Q You said there was nothing in the '507 patent which is equivalent to the wall generator of the '598 patent, is that correct?

A I believe that to be true.

Q Is there anything in the '507 patent which limits the movement of the ball from the top and bottom of the screen?

A I believe in the '507 patent the ball will actually bounce off the edge of the playing surface but it is not displayed as it enters the playing surface. I think that is correct.

Q You think or are you sure?

A Through my earlier reading of the patents, that is what I did get out of it.

THE COURT: Are you going to ask any more about the flip-flops?

MR. GOLDENBERG: I wasn't, your Honor.

THE COURT: When Mr. Baer testified in regard to, I think it was, the '593 flip-flop, he indicated that using two transistors in that connection was a major advance. I may be totally misquoting and misinterpreting what he said, but I would like your comments on whether or not the primary and secondary flip-flops in '598 are inventive in any way?

THE WITNESS: No, sir, they are not. I do think that the two transistor circuit to which you are probably referring was in the hit spot generator.

THE COURT: All right.

THE WITNESS: I think that is probably what you remember. There was considerable back and forth about a two transistor time delay circuit for the hit.

THE COURT: The gist of the testimony was that this was a far more economical way of doing it than had ever been thought possible before.

THE WITNESS: I think that was in discussion of the spot generator 1 or spot generator 2 for

the play control which he used two transistors in and was quite good.

THE COURT: Was that in '507 or '598?

THE WITNESS: That would have been in '507.

THE COURT: '507 and probably '598 as well?

THE WITNESS: '480 uses what they call a slicer.

Excuse me --

BY MR. GOLDENBERG:

Q Are you sure of that, sir?

A '480 uses a time delay, like a one shot, which is delaying from the horizontal sweep start until the time that you want to horizontally show your paddle. There was a time delay in '480.

Then in '507, instead of a time delay, the slicer circuit was used.

Then in '598, they went back to a direct time delay. Those were embodied in spot generators.

THE COURT: What about the two transistor method?

THE WITNESS: I think that is in the spot generator, sir, for the time delay.

THE COURT: Assuming that is so, then -- and I am sure it is if you say it is -- is that in your view something that is novel?

Holt - direct

1719

THE WITNESS: No, sir.

THE COURT: Perhaps you could develop this further, Mr. Goldenberg. I am sure you remember the testimony better than I do.

I am just trying to see if I can find it in my notes here.

MR. GOLDENBERG: Yes, your Honor.

BY MR. GOLDENBERG:

Q With respect to this two transistor circuit that the Judge has inquired about, what is the basis for your answer that that was not new?

A Well, sir, this is 1967 we are talking about here, or '66, in that area. By this time transistor circuits had now been used for sixteen years, fifteen, sixteen years.

One of the very basic things that you did with circuits when you wanted to build a little analog delay was to put in an RC time constant with a transistor to tell you when it got to a certain time period. This is a variation and, frankly, it was not a very stable circuit. I think that has been testified to and, indeed, it was abandoned and has been replaced.

Actually along about 1967 much superior circuits than that were available in the state of the art than this circuit. I am surprised they used it.

Holt - direct

THE COURT: All right, thank you, sir.

MR. GOLDENBERG: Your Honor, if I may have just a moment here?

THE COURT: Yes.

(There was a brief interruption, after which the following further proceedings were had herein:)

BY MR. GOLDENBERG:

Q Could you turn to the '598 patent, sir, and identify the circuit you believe that there was testimony about which involved two transistors?

A I am sorry. I have to find the '598.

I don't think I have that.

(There was a brief interruption, after which the following further proceedings were had herein:)

MR. GOLDENBERG: I hand you a copy of that patent.

THE COURT: I found what I was looking for in my notes.

Discounting the accuracy factor appropriately, here is what I have in substance: That Mr. Baer was talking about digital circuitry, and I asked him what he did that was new. He said that he felt he did make a unique contribu-

Holt - direct

tion in that he did in two transistors what had previously been done with four transistors.

The significance of the two transistors circuit was the price. It was cheaper than four transistors or an integrated circuit, and also the power consumption was less. I think that is what I am referring to.

MR. GOLDENBERG: I believe it is, your Honor.

THE COURT: Do the comments that you have made just in the last few minutes apply to that testimony?

THE WITNESS: Could your Honor help me by saying what circuit he was referring to?

THE COURT: This was in connection with Mr. Baer's explanation of the difference between '480 and '598 circuits.

THE WITNESS: Would he have been talking about a circuit in '598 then?

THE COURT: He was.

MR. GOLDENBERG: I believe he was, your Honor.

THE WITNESS: Perhaps Fig. 7A in '598.

THE COURT: It was on a redirect examination.

MR. GOLDENBERG: I believe it was, your Honor.

And I believe --

THE COURT: And it was toward -- actually, in fact it's the last note that I have about Mr. Baer's testimony, so it must be pretty close to the end of his testimony.

Why don't you go ahead, Mr. Goldenberg.

BY MR. GOLDENBERG:

Q All right. Assuming, with the '598 patent in front of you, sir, assuming that this had reference to that patent -- and we think it did -- what circuit in the '598 patent is a two transistor circuit, as Mr. Baer described it, sir?

A Well, I think the circuits we are talking about are

shown in Fig. 7A of '598, in which we see a pair of such circuits in '598. And the control signal could come from a player's knob for each and the horizontal sync pulse is coming in here.

And this circuit is a time delay circuit, which is a function - - it starts when a horizontal sync comes along and goes click, and then according to the setting of the player's knob you get another pulse out later. And the amount of time later is controlled by the knob.

And here is another similar circuit, and then these are tied together at the end in a coincidence circuit, which says both horizontal and vertical have run their time, let's now show a paddle position.

THE COURT: Well, is there anything about the use of two transistors rather than four transistors in connection with that circuit that at that time was, in your view, novel or extraordinary in any way?

THE WITNESS: No, sir. I would be hard put to it to find a use for four transistors in that, and would probably have -- I don't think that that is a very remarkable circuit for 1967, sir.

BY MR. GOLDENBERG:

Q In 1967 were there time delay circuits, to your knowledge, using two transistors?

A Yes, indeed. Yes. What we call one shot mono-stab

A one shot says what it means. You trigger it and you get one shot out of the barrel, and that's all. And then you have to trigger it again. And it's a time delay circuit, and they characteristically always have two transistors.

You can put other transistors in if you want to do some other functions, or perhaps make it more stable in some way. But in general, two transistors were all that was necessary.

Q Mr. Holt, do you have any belief that the technology with respect to the computer games that you and others have testified about taught the art anything which could be used to add ball bounce to the subject, to the subject matter or disclosure of the '480 patent?

A Yes. Ball bounce was demonstrated in the Michigan games, Michigan pool; it was demonstrated in Bounce Space War; and demonstrated in RCA pool games; all of which were made public and could have been very easily -- I mean used to help these men describe these games.

Q Do I understand, sir, that each one of those games involves a computer of perhaps some substantial size, at some substantial expense? How could that technology have any bearing on incorporating ball bounce in the subject matter of the '480 patents?

A Well, I would like to remind you that although the initial computers, your Honor, were very large and, true, expensive, they were designed to do a great many general purpose jobs. When you come right down to it, they, the people programming these,

Holt - direct

certainly taught the general idea of game playing and of hitting spots and fixed hitting spots. They taught that.

The technology used in computers when it was applied to a special purpose computer would get a great deal smaller.

In addition, of course, the components themselves got very much smaller and cheaper from the age of the big computers on which these games were initially played. The transistor was a great thing that brought the price and size down.

And so that both in terms of circuitry, the computer circuitries, digital circuitry, can trace its origin right back to the initial big computers, right down through a funnel to our present television games in terms of circuitry and in terms of the fact that the original game playing computers, they were much larger.

The main reason they were was they were designed to invert tremendous equations and do a lot of mathematics and general purpose things, not just play games. But when you then say, "Let me build a special purpose machine," it instantly gets a lot smaller and a lot cheaper.

So that I can trace both of these things

down to putting our modern television games, right from that source.

THE COURT: Do you feel that there is a greater difference between the accused games and the patents in suit than there is between the patents in suit and the prior art which you refer to?

Do you follow my question?

THE WITNESS: I think I do follow it, and I would say that --

THE COURT: The word "greater" may be ambiguous, and I will let you deal with it in any terms, either qualitative, quantitative, or however you feel comfortable.

THE WITNESS: Yes. Your Honor, I like Professor Kayton's expression, which was he said that in order for a claim to be not obvious, that it had to be an unexpected result.

And if you take the prior art sitting in front of these people at Sanders in 1967, and they had the '480 stuff right there and they had this other prior art, and to somebody skilled in the art it would not be an unexpected result, not synergistic, to put them together. And that really, it seems to me --

THE COURT: Assuming that is true, what about the accused games in relation to plaintiff's games, assuming just for the purpose of that separate analysis that the plaintiff's games are patented.

THE WITNESS: The distinction between -- well, the prior art to '507 is, of course, '480 and these other computer games. And you say is '507 more different from that prior art than the accused games are from '507, '598?

THE COURT: Right. And I realize that we are not concerned with whether or not the accused games are patentable. I am just interested in knowing whether you do see any difference in kind or degree between these three groups of games?

THE WITNESS: Your Honor, the accused games trace their lineage right through continuously through digital circuitry rather than analog circuitry.

'480 and '507, '598, are all analog circuitry really. I mean they are. Nothing "really" about it. Whereas the accused games come right down through the digital stream of things.

And the means of doing these things are very different. The operations are different.

THE COURT: You don't regard the switch from analog to digital in the accused games as being analogous to the change from the very large computer to the small computer?

THE WITNESS: No, sir. We had by 1967, in my laboratory, for example, very analogous circuits to all of these circuits. We were doing analog things in similar circuits. We were doing a lot of digital things at my laboratories.

I had during that time of '66 and '67, I had probably 20 engineers working for me in, mostly in very closely related fields. We were in high technology stuff. And these fellows all the time were hooking together analog and digital convertors, going back and forth between analog circuits and digital circuits. We were hooking potentiometers onto things and making displays..

THE COURT: When you are saying you were going back and forth like that, aren't you really saying these two things are equivalent?

THE WITNESS: They are not equivalent in means and they are not equivalent in operation, sir.

THE COURT: Well, you are begging the question, aren't you, sir? You are telling me it is a simple thing to switch back and forth between digital and analog. And I have heard testimony that sometimes it is arguable whether a particular circuit is analog or digital. And my question based on that is, are these things the equivalent of each other, recognizing, of course, that they look different and don't operate in quite the same way in getting to the end result, but they nonetheless seem, according to some testimony here, to produce the same end result.

THE WITNESS: Sir, I think I misspoke. What I was trying to say is that we were building convertors

that would go from a digital framework to an analog framework and vice versa, and we had engineers who were familiar with both of them and could convert. But the circuits are by no means the same. They are not the same kind of circuits at all.

It is true that functionally one can, by counting, for example, like we had this morning, counting the marks on a piece of string, find out how tall digitally a person was, or you could just hold up the string and see how tall he was, which would be the analog way. So that functionally there are many equivalents. But they are quite different in the circuits and they are different in the way they are operated.

THE COURT: Aside from the question of a possible failure in power supply, is there any other way in which digital might be superior to analog in the context of these games?

THE WITNESS: Well, one important thing is that all today's TV games are strictly digital. I mean, they are cheaper. They are better.

THE COURT: Well, that's after the fact.

THE WITNESS: Okay. In 1972, sir, which is the date in litigation, I believe, the games that were developed by Atari and by these other people were all digital.

THE COURT: Why do you think they went the digital route rather than the analog route?

THE WITNESS: Because they recognized that it would be certainly cheaper in the future and it makes a much better presentation. It has many advantages.

THE COURT: Well, what are they?

THE WITNESS: Well, the advantages of digital circuitry over analog circuitry, first of all are that you can design everything on paper without having to go to the laboratory and tinker with it. That is one example.

It's like, you remember erector sets, the electronic equivalent of an erector set.

THE COURT: Can't you do that with an integrated circuit on an analog basis?

THE WITNESS: I found much difficulty with that, your Honor, in my life. You almost invariably have to -- you draw something on paper and then you go to a lab and you breadboard it and you hook it up, and if something is wrong, you have got feedback wrong or you have to put in some extra things, and the thing starts to smoke and back to the drawing board, or at least tinkering. And when you have got a situation involving 30 or 40 analog transistors it gets worse and worse.

There are many reasons, of which that is one.

I think almost every engineer is following his nose in seeing that the digital stuff is bound to in the future get cheaper and more applicable to many things.

In other words, digital circuits have become very popular for the reason that they can be applied to so many things, the same circuit, not just one thing.

THE COURT: All right, thank you.

MR. GOLDENBERG: Your Honor, just so the Court might have it, I think the question about two transistors appears on page 441 of the record. This was a question from the Court at that time, page 441, 442.

It turns out there is a typographical error there. It refers to "two transformers."

We have no doubt that that means two transistors.

THE COURT: I hope, incidentally, that my court reporters understand this electronic terminology better than I do, or I can foresee many mistakes in the transcript.

That was page 441, you say?

MR. GOLDENBERG: 441, 442, your Honor.

THE COURT: Thank you.

BY MR. GOLDENBERG:

Q Mr. Holt, I am not sure that we finished this topic of how could this computer technology have suggested to the people who did the work on the '507 and

'598 patents the elements which distinguish those patents from the '480 patent, or had you completed your answer on that question, sir?

A The distinguishing feature between the '507 and the '480 is the fact that we can have a ball bounce. That is taught in the '507 and is not taught in '480. The distinction between '598 and '507 is the fact of the wall generator. The wall is actually displayed in '598 and not taught in '507.

Q Do you have my question, that the technology that was available in the computer games which showed one symbol bouncing off of another symbol or a symbol bouncing off of a wall, how could that have been used by someone to improve, if you will, the apparatus disclosed in the '480 patent?

A The previous computer games -- what you are calling computer games is the ones played by the big, general purpose computers -- the very fact of their existence, of ball bounce being demonstrated, would give a person the clue. The circuit shown for reversing a ball, if you will, which is shown in the '507, Figure 12A, that flip-flop circuit is a typical product of the giant general purpose computer technology.

Flip-flops were extensively developed

and used in the general purpose computers. So that circuit is a clear derivation from that technology.

Q How about the coincidence circuit?

A The coincidence shown, typically computers use literally millions of coincidence circuits. They are called AND Gates. It is the same thing.

Generally if you are working in analog circuitry, instead of saying an AND Gate, you would say coincidence, meaning that two things happen at the same time. That is what coincidence means.

If you were in analog circuitry, you might, for example, hook the collectors -- well, let me get specific a moment. They show a coincidence gate in, for example, Figure 7A of the '598.

The fact that they tied those two transistors together right here in the collectors makes it an AND Gate. That type of an AND Gate was used specifically in that form in some of the very earliest computer circuits, in the Philco machine, for example. That was a typical AND Gate in the 1955 general purpose computers.

It is called a coincidence circuit here; it was called an AND Gate back in 1955 in the Philco computer technology.

So that is at least two examples.

There are, of course, the time delay circuits, but those were mostly generated in '480 anyway.

Q Would you turn to the book of prior art patents, Defendants' Exhibit 9, and commencing with the first patent in that book state what it describes and relate it, if you can, to the circuits of either the '507 or the '598 patents?

A Your Honor, in Hurford, which is the first tab of this book, Hurford '247 describes an indicator for television images.

In this patent which was filed in 1951, Hurford is providing a way of moving a spot on a television set. The reason he wanted to do it was probably because perhaps a commentator was discussing the news and he wanted to point out the figure of which one was Premier Kosygin, or somebody, on the television screen. So he would move his knob and a little dot would appear.

In other words, that is all Hurford teaches here.

The block diagram shows the essential elements here. To my mind it shows essentially the spot generator, which can be moved around. That is what is shown in Figure 1 of this.

Q Can you relate that to any figure of the '507 patent?

A I think that it would be quite equivalent to the Spot 1 generator in Fig. 12A of the '507 patent.

Q Did it use in any way either the vertical or horizontal sync signals?

A Yes, sir, it used both of them in very, very similar ways here. Horizontal sync was provided and vertical sync was provided.

Time delays using multi-vibrators appear in Hurford and coincidence gates between the time delays, which then allows the spot to appear.

Q I direct your attention to Fig. 8 of the '507 patent. Could you state what that figure is?

THE COURT: What figure are we on?

MR. GOLDENBERG: Fig. 8, your Honor.

THE COURT: Of what?

MR. GOLDENBERG: Of the '507 patent.

THE WITNESS: I don't have '507 here.

(There was a brief interruption, after which the following proceedings were had herein:)

THE WITNESS: What figure was that, please?

MR. GOLDENBERG: Fig. 8.

Your Honor, what the witness has available to him is the '284 patent, wherein the disclosure is the same.

THE WITNESS: Yes, sir, I have this in front of me now.

BY MR. GOLDENBERG:

Q Could you state what is shown in Fig. 8?

A Fig. 8 is showing a circuit which the inventor called a slicer circuit, or it is actually two slicer circuits.

It provides a way of adding together a horizontal sawtooth together with a knob control voltage and adding together the vertical sawtooth signal together with a voltage from a different knob that the person can control.

Those are shown there. Then they are combined again in a coincidence and AND Gate.

Q Was that a spot generator circuit, sir?

A That is a spot generator.

Q Are the inputs to that spot generator circuit in any way similar to the inputs to the spot generator circuit of the Hurford patent that you just described?

A The Hurford patent has its input pulses, sir. The horizontal sync, as shown as the input in Hurford, are in terms of spikes. The horizontal input to Fig. 8, to the contrary, are sawtooth wave forms.

They are very closely tied together; that is to say, the spike invariably signals the start of the sawtooth wave. So they are very closely related. They are specifically different, however.

Q I understand that, but two of the inputs on the spot generator Fig. 8 signals represent the horizontal and vertical sync signals?

A In Fig. 8 is listed horizontal sync sawtooth generator as an input.

Q Is there also a signal representing --

A Vertical sync sawtooth generator.

Q Are there also signals in the Hurford circuit? Are two of those input signals representing the horizontal and vertical sync signals?

A They represent the time that they would be occurring. As a matter of fact, those in Hurford really are the sync signals; whereas the sawtooth are the result of sync signals.

Q Are two of the other inputs to the spot generator in Fig. 8 voltages, the purpose of which is to control the position of the spot on the screen?

A That's correct.

Q Is that equally true of the circuit in the Hurford patent?

A Yes, it is.

Q Do you see any significance in the fact that in the Hurford patent, the spot to be generated was transmitted out over the airwaves and picked up by a home television receiver and the fact that in Fig. 8, the signal was to be coupled directly to the antenna terminals of the television receiver?

A I don't see any great significance in this. I think you have explained it very well.

Q When you don't see any significance in that, could you state what you mean by that?

A Presumably the apparatus shown in Fig. 8 was intended to be used only on one display device, one television receiver; whereas a news commentator who was using Hurford's device, it might go out to a million television receivers.

I think that is about the extent of its significance.

Q Do you see any technical difference there?

A No, actually in both cases they are modulating an oscillator. In one case the oscillator has a lot more power and it goes up on top of a big tower to be broadcast.

Q Could you turn to Fig. 7A of the '598 patent, and I would ask you to compare the circuit of the Hurford patent to that figure.

A These are both what we call RC delay circuits and have a lot of similarities.

Q Do they have similar inputs, sir?

A In 7A we have a horizontal sync pulse, which is a pulse this time, not a sawtooth, and the vertical in the same way. Those do appear in the Hurford patent also as pulses, so they are similar in that respect.

The control signals in 7A, e sub horizontal and signal e sub vertical, are derived in Hurford also. They are shown very clearly in Figure 1, this wiggly line with the arrow on it which is the potentiometer, right in the middle of the page, labeled 23 there.

Q Would you turn to the next patent, included under Tab 2 in Defendants' Exhibit 9, and state what that discloses and again relate it, if you can, to Figure 8 of the '507 patent and Figure 7A of the '598 patent?

A Taking Figure 1 of Balding, your Honor, right here, this circuit up there (indicating), of Figure 1 of Balding is very nearly identical to the drawing of what would be Figure 8 of the '507.

Back to back diodes are used and rather cleverly, I thought, but it was a long time before in the state of the art.

Balding has used diodes with one pair of them hooked to the ground here; whereas in the cir-

cuit of '507, they are in a slightly different place, but they do the same job. They are, as a matter of fact, adding together manually generated control voltage and the sawtooth and giving a pulse at a time which the guy pushing the knob can control.

It does give a pulse which can then be applied to a screen. In both cases the inventors are applying it to a screen.

The Balding patent was filed in 1962, by the way.

Q Could you turn to the patent under Tab 5 in Defendants' Exhibit 9 and describe what that patent discloses?

A This patent discloses a visual cue generator. The object in this case was to present to a pilot an artificial runway for a particular use of it, and it is a very nice use of it. He sat down and tried to figure out what kinds of things would indicate to a pilot how he was doing if he couldn't see the runway but he was looking at it on a screen.

He would see the perspective, the runway getting smaller as it got to the top of his vision, and if he was upside down, it would go the other way.

As he was sluing back and forth, it would show him in what way he was sluing. So Balding

presents ways of presenting visual cues on a screen for purposes of pilot training or an actual flight under zero conditions.

Q Do you know whether or not raster scan was used as the display technique in this Balding patent, Reissue 25,756?

A Yes, that is correct. As a matter of fact, on the second page, your Honor, of this patent there is a big sign down here saying "TV Monitor". It isn't a television receiver, I guess; it is a monitor.

You can see it on the next page. It is "TV Monitor".

THE COURT: Oh, yes, I see.

BY MR. GOLDENBERG:

Q Reverting for a moment to the first Balding patent under Tab 2, do you know whether or not that used raster scan for the display?

A I believe it does.

THE COURT: You mean the first Balding?

MR. GOLDENBERG: The first Balding patent, your Honor. That would be 3,122,607, under Tab 2 in Exhibit 9.

BY THE WITNESS:

A Yes, I believe that does.

BY MR. GOLDENBERG:

Q Mr. Holt, if one assumes that it was known in 1967 -- let me change that to 1968 because I think in the early part of -- well, let me say by June of 1967 if it was known to play games on a screen of a home television receiver by generating spots to be displayed on a screen of that receiver, and if it was known to provide means to manipulate the position of those spots and in the display and manipulation of those spots to use raster scan display techniques and if circuits for generating symbols were known and if circuits for detecting coincidence were known and it was also known that games could be played on the screens of cathode ray tubes where one spot bounced off of another spot or a stationary wall symbol, do you have an opinion as to whether or not it would have been obvious or unobvious to a person of ordinary skill in the art at that time to have made the disclosure of the '507 patent.

A Well, again I would like to use this word "unexpected result" because --

Q Well, could you answer the question first as to whether or not you have an opinion on the matter?

A I have an opinion that it would have been obvious, yes.

Q All right, sir. Could you state the basis for your opinion?

A Well, as I say, I used a couple of other tests for myself. Now, this diode amplifier that I had in 1952, that was an unexpected result, because it never occurred to me or any of the engineers around me that a diode could amplify. That's an unexpected result.

There have been a lot of inventions that are unexpected results, I am happy to say, and some that are not. Let's look a minute here at the engineers that I might have -- that I did have working for me in June of '67, and I had, as I say, quite a lot of engineers working for me, and I do believe that any one of 6 or 7 of these engineers -- and they tended to be people of 5 or 6 years of experience since their engineering degree, on the average, and some of them were very bright fellows, but let's take an average, and if I had presented them with the data that you just presented me with, I think that it is quite reasonable that they would have come up with some kind of a similar game as it was done

in the '507 and the '598.

Q All right, sir.

A It is certainly not an expected result if you take the circuitry which is shown in '498 and you take the knowledge that a hitting spot can hit a spot and it can bounce off and if you want to put them together you know ahead of time what it's going to look like. It's not an unexpected result.

Q All right, sir. If I add to what I have said with respect to the '507 patent --

Well, let me not add anything. Let me ask you the same question with the same assumptions with respect to the '598 patent. Would you have considered that -- do you have an opinion with respect to whether or not the disclosure of that patent was obvious or unobvious to a person of ordinary skill in the art at the time it was made in approximately 1967?

A I have got to say it would be obvious, because we were already in that -- we were already taught that as a matter of fact the symbol bounces off the top. But it wasn't shown in the previous -- in the prior art, and it seems to me really trivial to say, "Well, we ought to show the player what that is going to bounce off of."

Q Where was this -- I am sorry -- when you say this was shown?

A '598 displays the wall. The previous patent actually had a wall, electronically had the wall there, but

they didn't display it.

Q And the previous patent is --

A The previous patent is '507.

Q I am not too sure you haven't answered this, but I would like to have it, and that is what would be your understanding of the level of the skill of the ordinary man working in the art that has been the subject of this controversy here in the period 1966-1967?

A Well, I can best answer that from my own experience, and, as I say, we had on our staff a number of engineers that did vary, and their experience varied all the way from maybe some fellows that had never got out of college, all the way up to people that had had 15 years of experience since their Bachelor's degree. And these people would be familiar and capable of almost literally throwing together circuits. It is really a joy to see them operate. You give them an idea about doing something and say, "Go do it" and he might do part of the circuit in analog. They were all familiar with analog designs. And where it was easier to do it in analog they would do it in analog. Where it was easier to do it in digital they would do it in digital.

They would be able to on the one hand program a general purpose computer -- and many of them programmed games in those days on our general purpose

detail. Is that the wrapper you are referring to? computers. We had a mini-computer. They would be able, and as a matter of fact, in developing our machinery, they had to program these general purpose computers to operate our machinery. The machinery we were building required a small general purpose computer to control it.

So these people would have experience and theoretical knowledge of analog and digital circuits, of large scale general purpose computer circuits, of special purpose computer circuits, which is what we were building, and would be capable of handling the kinds -- they also used displays a great deal.

Q What kind of displays, sir?

A Well, two kinds. The oscilloscope was used, and we often hook together an oscilloscope to be a raster scan display.

And on the other hand we were using the -- what I call CRT terminals, output from the computer, which is a display using a television tube, a raster scan.

Q Have you had an opportunity to consider the prior art of record in the Patent Office during the prosecution of the applications for the '507 and '598 patents?

A I have read the file wrapper, not in complete

Q I have particular reference to the patents which were cited by the examiner and are here of record.

A Oh, yes, I have read those, sir.

Q Can you state whether or not any of those patents disclose any means for playing the game on a home television receiver?

And here I expect you are referring to -- could you identify the Defendant's Exhibit number?

A This is Defendants' Exhibit 11, your Honor, in the black cover, and this is the prior art of record in the Patent Office.

Well, the patent of Goldsmith, '992, is not a raster scan, as I remember reading it. It is described as a cathode ray tube amusement device.

Q Well, sir, could you answer the specific question, and perhaps I will repeat it for you. Do any of those patents disclose any apparatus for playing games on a home television receiver?

A No, sir. I didn't see it.

Q That is disclosed in the '480 patent, is it not?

A Yes, it is.

Q Do any of those patents disclose any apparatus for playing games on a cathode ray tube where one spot bounces off of another spot?

A No, sir.

Q That was available on the Michigan and RCA pool games, was it not?

A Correct.

Q Do any of those patents disclose any apparatus where one spot bounces off of a fixed hit or wall symbol?

A I didn't see any.

Q That was available, was it not, in the RCA pool games, is that correct?

A A fixed hitting symbol?

Q Yes, sir.

A Yes.

Q Do you have any opinion about the relationship of the defendants' games to the extent that you have studied them, sir, and these computer games about which you and others have testified?

A I think that the defendants' games are really a direct descendent of the games that were played on general purpose computers, and the defendants' games are played on a special purpose digital computer. That's what it amounts to.

Q Could you state what you mean by a special purpose digital computer?

A Well, I will have to take that back now, because it turns out that many of these things you can play three games on, so it's no longer specialized to one game. But three

games is still specialized compared to the infinite variety of games, for that matter, that one could play on a general purpose computer. But hopefully the general purpose earns its living by doing more mundane things, such as keeping track of bank accounts and things like that.

Q All right, sir. Could you elaborate on why you believe this connection exists, beyond anything you have said at this moment?

A The velocity and the method and the means come down intact, sir. Our initial digital computers were very, very large, because we didn't know how to make them small. The vacuum tubes were big, and they were hot. You had to keep them apart or they burned things up. So the things were big, and it was expensive, because you had to use a lot of parts, where we really theoretically didn't.

The philosophy of the digital computer circuits, of being able to accomplish these funny things -- funny things we see in the games, interesting things we see -- was developed and comes down to us through the computer circuitry.

The transistor was the first thing that we really made -- shrunk the whole thing up. And then when we shrunk the transistor into the little black integrated circuit where you suddenly have a thousand transistors in there, that really traced it down to a place where you could really use it.

And then it shrank again with the LSI, which is in the games that are sold today, which is on only one chip.

So that the circuitry traces a direct path. The philosophy of being able to play these games at all originated with these early guys.

Q Well, sir, with respect to circuit elements, for instance, it's been testified that there were adders used in the defendants' games. Did computers have adders?

A Yes, sir, they do. They did. They did in 1949, or 1944, for that matter.

Q Did they have pulse counters?

A They did.

Q And I believe you have heard testimony that there were counters in the defendants' games.

A That is correct.

Q Did computers have clocks?

A Yes, sir.

Q Could you state what a clock is?

A A clock is really basic to -- it provides a series of pulses which are, for the most part, counted and added. And so the clock is the place where everything starts. It provides signals which are then shuttled around, like it provides, for example, the marks on the tape. The clock -- suppose you had a piece of Bayer tape -- and the manufacturer's tape may do this, for all I know -- and he has got a

squirt gun with a clock on it that every second it puts on a new block of paint and moves the tape by it. That's what a clock does for a computer. It marks the digital pulses which are to be used throughout the whole computer. It generates them.

Q Do the defendants' games have clocks in them?

A Yes.

MR. GOLDENBERG: Your Honor, we have no further questions.

THE COURT: All right.

MR. ANDERSON: Would it be appropriate to take a short break here?

THE COURT: Yes, all right.

(There was a short recess, after which the following further proceedings were had herein:)

CROSS-EXAMINATION

BY MR. ANDERSON:

Q Mr. Holt, how many people are employed by Arthur Holt, Inc.?

A Me.

Q Just you?

A Mostly just me.

Q How many times have you been retained or engaged with respect to litigation?

A I think this is my fourth time.

Q Did the prior three occasions occur within the last year or two?

A I am sorry?

Q When did the other three occasions occur when you were retained?

A I think the first occasion occurred in early '73. I think two more have occurred within the last year, year and a half.

Q Were these all patent cases?

A Yes, they were.

Q Did you testify in each of them or did you merely prepare to testify?

A No, I testified at all of them.

Q Did you perform any services with respect to any other litigation other than those four?

A No.

Q Mr. Holt, Section 103 of the patent laws refers to, "A person having ordinary skill in the art to which said subject matter pertains."

Mr. Goldenberg has asked you some questions regarding your opinion regarding the art. What is that art to which you think the subject matter of this case pertains?

A There are a number of arts relating. The basic art would be games. Displays is another one.

Q What is the art to which the subject matter of this lawsuit pertains, as you understand "the art"?

A I am afraid I am not qualified to understand your question.

THE COURT: I think he means what field. Is it electronics? Is it chemistry?

BY MR. ANDERSON:

Q Or is it television games?

A I would think that certainly games is one of the arts and certainly it is done with electronics. Displays is another art. It would fall under electronic circuits, digital circuits, analog circuits.

Q What is "the art" to which the subject matter of the issues of this lawsuit pertains so that we can decide whether a given activity was obvious or unobvious to a person

having ordinary skill in that art?

MR. GOLDENBERG: Your Honor, I object to the form of this line of questioning because that, of course, is not really a reading of the statute. The statute makes reference to the art to which it relates also.

THE COURT: 103 refers to "the art".

You should have known better than to have given me this book.

MR. GOLDENBERG: And my phrase isn't in there, your Honor?

THE COURT: It may be, but not in the section I am looking at, I don't think.

MR. GOLDENBERG: Excuse me. Forgive me. I was having a mental aberration. I apologize to the Court and Mr. Anderson.

THE COURT: Nothing is more dangerous than giving a judge a book.

BY MR. ANDERSON:

Q I will read Section 103 to you:

"A patent may not be obtained, though the invention is not identically disclosed or described as set forth in Section 102 of this Title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time that the invention was made to a person having ordinary skill in the art to which said subject matter pertains."

What was the art to which the subject

matter of these patents pertains?

A The first art that we speak of is the art disclosed in '480. That is one of the important ingredients in the state of the art at that time. And another important --

Q I want to know the art, so we will know who the artisan is, so we will know who to look to. What is the art that we are concerned with here?

A I don't know the technical -- your patent-wise meaning of the word "art". Would you give me that meaning?

Q Yes. As the Judge selected, what is the field?

A Electronics. That's a good one.

Q The field of commerce that we are concerned with.

A Electronics.

Q Electronics.

A Electronics would be a good general broad field.

Q And you say that that is the art generally, electronics, to which all of the subject matter of this lawsuit pertains?

A I would think that is broad enough, yes.

Q And would you define who you considered to be the person having ordinary skill in the electronic art? Who is the man having ordinary skill in the electronic art?

A I would feel that a typical middle grade engineer working for me in the year 1966 would be a good candidate for that fellow.

Q He would not be a computer programmer, is that right?

A He would probably have programmed computers at some time, and maybe occasionally. Not generally, as a primary way of earning his living, no.

Q Now, to your knowledge, when was the first television game with raster scan commercially available?

A Well, my information would be drawn from the testimony I have heard at this trial and from what I read before.

Q Do you have any independent knowledge of when the first television game with raster scan became commercially available, apart from what you have learned in preparation to testify here?

A Only from the information I have read in the pretrial. I knew some approximate dates, but they got earlier as I read the data that was presented to me.

Q All right. Approximately when was the first

television game with raster scan commercially available, as you understand it from your preparation to testify here?

A This would be in 1972, I believe.

Q Now, I think you testified that in 1954 it was optional to use raster scan in place of point to point displays as the output from a computer. Was that your testimony?

A I said that it's a perfectly reasonable choice.

Q It was a perfectly reasonable choice. What is the earliest commercial computer terminal of which you are aware that was available for accepting the output of a computer and generating a display which used a TV-type raster scan, the very earliest commercially available terminal of that kind, so that we can check it?

A Well, I think that that would be in the area of around about '67, somewhere in that area.

Q Well, what terminal do you know of that you are thinking of, so that we can check when it became available?

A I do not remember the commercial name of it.

Q Who made it?

A I don't remember.

Q So you don't know when it came out either, is

that right?

A Yes. Well, I know that we were starting to hook those machines to our computers along about that time.

Q Isn't it a fact that there aren't available any such TV type raster scan terminals for computers until some time in the 1970s?

A We were certainly using those. Now, there may have been some that we hooked up for ourselves. It may be that they were not very widely commercially available until later. We were certainly using them along about in that era.

Q But you don't know the name of one. What's the earliest one that you do know of commercially?

A I don't remember the name of it.

Q Do you know the name of any?

A Well, certainly. There are a number of them. Sanders, for example, makes one.

Q And when did they first come out with one, if you know? Wasn't it in the '70s?

A I don't remember when they came out.

Q In order to be an option for an engineer, a given alternative must have been available, isn't that true?

A No, for example, in 1954 we were just making one of a kind things and you built it yourself.

Q Do you know in this record of any indication, any evidence, that would show a suggestion of an alternative use of a raster scan TV type display as an output of a computer prior to 1970?

A A commercial --

Q Commercial or otherwise.

A Commercial use of a raster scan?

Q Display with a computer.

A I don't think that we have to limit ourselves to commercial because --

Q Where in the record is there any suggestion of the use of a raster type display with a computer in this record, commercial or non-commercial, prior to 1970?

A I was in the laboratory --

Q In this record, before this Court.

A Well, is my testimony part of the record? I will tell you that in my laboratory I was doing it.

Q I would like it apart from your testimony. Your testimony is --

A My testimony is pretty good because we were taking stuff from computers and displaying them in a raster scan

oscilloscope presentation back in those early days. The OCR business required it of us, really.

Q I would like to question that. How can you establish, prove, that you actually had a raster scan display associated with a computer prior to 1970? Can you prove it?

A I can call up some of the fellows who helped me with these things.

To be very specific about this, we would typically pick up an image and store it in a great set of registers, computer flip-flops, and storage means typically associated with computers and all of the control paraphernalia, and then we would want to see what this image looked like. We would present this, hook up a raster scan on the television, and it worked out very nicely.

Q Was that with respect to some specific project that you could give me a number on that I could verify?

A Yes, indeed, for example, in my resume -- I don't have a copy of it here -- but one of my early patents had to do with -- now, the patent did issue a little later than the time we are talking about, but let's look at 3,104,369 which is about the middle of the page, page 4 here, high speed identification of printed matter.

Q Does that refer to a raster scan associated with a computer?

A No, this was a project in which I used this method

for displaying the results that I was working on in the project.

Q Do you have anything that shows that that you could produce?

A Not on my person. I can certainly find that in my laboratory notebooks, which are back at Rabinow Engineering.

Q Do you have access to those?

A Probably could have if I got permission.

Q Mr. Holt, you heard Mr. Dabrowski testify, and I think you have testified that you are familiar with the accused circuits and the patents but that he was much more familiar with the accused circuits than you, is that correct?

A I testified something close to that, yes.

Q With respect to the patents and the accused games, do you agree with the testimony that Mr. Dabrowski gave?

A I paid particular attention to the question of ball bounce, and I traced through the logic, and I believe that what he has testified certainly is true.

Q And in all other respects you agree with his testimony?

A I think that it seemed to me that once or twice the record was a little vague as to whether he said the same thing twice, but otherwise where he made strong -- now, the question of whether a particular function was enclosed all in the purple part and the other parts, I think there was some backing and forth there.

Q As it ended up, did you have any disagreement with his testimony?

A I would not like to take the stand as somebody that is as familiar with those diagrams as Dabrowski because he was chief engineer of production of these machines.

I had the opportunity to study the circuits some number of hours. I am familiar with the types of symbols that are used there. Some of the type numbers of the chips themselves I would have to go to the Fairchild Catalog in order to make sure what they were; but if you would present me a section here and ask me and give me enough time to look up these things, I am qualified to take them through and give you an answer, if we have enough time.

Q Don't misunderstand. I just wanted to be certain that you didn't have any specific disagreement with Mr. Dabrowski and his testimony. That is all.

A Not on any substantive matters.

Q Fine. Thank you.

A I may have missed some of the details of what he said -- I tried to listen hard -- but not on his basic conclusions.

Q Assume that the '480 patent application is considered by the examiner, that he found it wanting in its total disclosure, and that he allowed the claims of the '507 and '598 patent over the '480 application. Do you agree that all of the other prior art is less important than the '480 patent in that regard?

A No, sir, the '480 did not even describe ball bounce, and that is really a very important part of '507. In fact, it is the only difference between that and '480.

Q So you consider other art more important -- I understood in your direct that you said the '480 was the most important patent. Do you consider other art more important?

A I don't really know what more important is. Certainly '480 contains a great deal of material which was embodied in '507. The main thing that is not em-

bodied in '480 is the ball bounce.

Q I would like to read to you from page 1680 of the transcript today. The question was:

"Q Could you state, sir, what the prior art is which you have studied?

A The most important prior art is the '480 patent."

Now, is that your testimony or isn't it?

A If that is what I said, I will certainly agree with it.

Q So all of the other art that is before the Court is less important than the '480, is that correct?

A I will stick with that.

Q All right, thank you.

Am I correct that even if one combined the '480 application disclosure and one of the pool demonstrations, you would still not have a paddle and ball type of game with a hitting symbol controlled by the player to change the direction of a hit symbol?

A Would you try me again on that question?

MR. ANDERSON: Certainly. Would you read it please?

Q (Read by the reporter.)

BY THE WITNESS:

A My answer is that I think you would have that type of game.

BY MR. ANDERSON:

Q Which one of those shows a player manipulated paddle type symbol to engage a symbol such as a ball and change its direction?

A The Michigan pool had a striking member, a cue stick, which is equivalent to a paddle.

Q Did it matter in Michigan pool whether the cue stick was anywhere near the cue ball at the time that the player pressed the button to initiate the demonstration?

A I believe the principle is adequately disclosed there.

Q Would you answer my question?

A The principle of having a member that is going to hit something else.

MR. ANDERSON: Would you please read the question to the witness again?

Q (Read by the reporter.)

BY THE WITNESS:

A I believe that the actual tip of the cue symbol did not have to touch the cue ball. It was the angle, and the angle was important.

Holt - cross

1771

The angle of the displayed cue stick did operate, did provide information to the cue ball as to which direction it was going to be hit in.

BY MR. ANDERSON:

Q Is the answer to my question then yes or no?

A The answer was that the tip of the cue stick did not have to be next to the cue ball.

Q And then my question is, did it matter where on the screen that cue stick was located at the time player pressed the button to start the demonstration in the way the demonstration was executed, or could be --

A I think I would say that is correct.

Q It didn't matter at all?

A It didn't matter where it was. The angle did not.

Q Right. And the cue stick did not have to move at all on the screen in order to execute the complete demonstration at any time?

A No.

Q Except to rotate it?

A No. The cue stick certainly had to be rotated and angled in order to play the game.

Q Then there was no paddle display or other hitting symbol to hit a ball or symbol, hit symbol, to change its motion in the Michigan pool demonstration, is that correct?

A Well, there were 15 of them. Each ball was hitting the other. Each one became a hit symbol and hit another ball.

Q Was there a prior control symbol used to play the game after the button was pushed to start the demonstration?

A No.

Q Not at all?

A No.

Q Was there a player controlled symbol that had to be moved to a particular location in order to start the demonstration, or was it just a matter of rotating a knob to rotate this straight line that was called a cue?

A I am willing to give you everything you want on this. In the Michigan pool, to the best of my knowledge, it didn't matter in the X-Y coordinates where -- I mean here is a cue ball sitting there, and you could be like this (indicating), or here (indicating) or the cue could be like that (indicating). But the angle that you had this thing pointed was the important thing, and that was manipulable. And after you once pushed the button, then you had no more control manually over it.

Q Now, you said there is no item of prior art that you know of that shows a paddle and ball type of interactive display in which the paddle is controlled by the player to cause a change in the direction of the ball; am I correct?

A Well, I am sorry. I missed the first phrase.

Q All right. Am I correct that there is no single item of prior art in all of all the prior art that you know of that is involved in this action that shows a description or demonstration of a game in which a player controlled symbol

is moved about during play to interrupt or intercept and change the direction of a ball or similar hit symbol?

A Space War would have done that.

Q Did Space War change the motion of anything, as you understand the disclosures that you have read?

A Space War moved -- you had two space ships. Each player controlled a space ship, and they were moving around and firing projectiles which bounced off the walls.

Q The projectiles bounced off the walls?

A The projectiles bounced off the walls. And I think the ships bounced off the walls too, if they hit them.

Q And were the walls in some way player controlled?

A No. The walls were fixed hitting symbols.

Q Then what was the -- I don't follow -- what was the player controlled symbol in Space War that could be used to hit some other symbol and change its direction of motion?

A In Space War the warships fired projectiles which hit a wall, in the bounce war, and changed direction from that.

Q Now, what is the player controlled symbol in your answer?

A The player controlled symbol is the warships, the spaceships.

Q Now, does a player control --

A And he also has control over the projectiles. He could fire them by pushing the button.

Q And then they just went in their own direction then?

A According to the directions they were aimed.

Q Now, you say the spaceship or the missile was the player controlled symbol. Now, in Space War did that player controlled symbol interrupt any other moving symbol and change its direction of travel, as far as you know?

A If it was hit by a projectile from the other, then you had drastic action, like an explosion.

Q Okay, the explosion was of the player controlled symbol?

A I think so.

Q Is there anything in Space War where a player controlled symbol caused another symbol like a ball to change its direction when the player controlled symbol hit it?

A I don't think so.

Q Now, Space War did not use horizontal or vertical sync or sawtooth or generating or raster, or any of the other aspects of TV type displays that we have been talking about, is that correct?

A I think that is correct.

Q Am I correct that there is no single teaching that you know of, no single item of prior art, that could be considered as a complete anticipation for the invention of the '507 or the '598 patent; that you must combine references and prior art teachings?

A I think that's true.

Q There must be a combination?

A I think that's true.

However, I think that the combination was, you know, obvious. It didn't give an unexpected result.

Q And after you make your best combination, say of the '480 patent application and Space War, it's a fact that you still do not have the teaching of a game or demonstration in which a player controlled movable symbol will hit and change the direction of a hit symbol, is that correct?

MR. GOLDENBERG: Your Honor, I object to the form of that question as lacking a foundation. I don't believe that the witness has testified that that was "the best combination".

THE COURT: Well, I have the impression he felt it was as good as any. Let's find out whether he thinks there is any better.

MR. ANDERSON: All right.

THE WITNESS: I'm afraid I will need the question again.

MR. ANDERSON: All right. Would you read the question?

Q (Read by the reporter.)

BY THE WITNESS:

A I think that if you combine the ideas which were flying around the computer type people with the kind of knowledge that was shown in '480, that the next step is pretty clear, what you should do.

BY MR. ANDERSON:

Q Well, now we have before us in this case the '480 application, and we have three specific computer demonstrations, Space War, a demonstration on the Michigan MIDSAC computer and the demonstration on the RCA Spectra 70 computer.

Now, in your answer are you referring

to one of those three demonstrations as showing this feature of an interactive ball and player causing the player to change the motion of the ball or similar symbols?

A No, sir. What I am saying is that if I had been working in the environment that the people that did '480 were working in, and with all of the knowledge of these computer-like -- general purpose computer driven games, and you don't get an input just from a single thing, it's a kind of a milieu you are in, and you are talking to all of your friends here and there and you are reading articles about these things, and these ideas sort of start coming in and they all come together. It's not just a single idea that hits you. They all show parts of it and can be added together to produce what is -- not what I consider is an unexpected result.

Q All right. Where do you find among all of that specifically that we can check the missing link in your answer to my previous question regarding what was missing in the combination of the '480 application and one of the three computer demonstrations that we have before the Court, where in the prior art do you find the teaching of an interactive hitting symbol movable by the player in the play of the game to change the direction of travel of a hit symbol of some sort?

A I find that the best place would be to go right to the claims of '507. The only claim which is really different --

Q Can you answer my question?

A Yes. My answer is that it is a hitting symbol that is different.

Q What?

A It is a hitting symbol which is added. You need to add a hitting symbol to '480 in order to get '507. You find a hitting symbol in Michigan pool, in RCA pool, also in Space War. That's where you find it.

Q Is there a player controlled symbol that is controlled during the play or demonstration of Michigan pool that is movable by the player during the execution, or doesn't the player press the button, sit back and just watch?

A That I don't believe has specifically to do with the hitting symbol.

Q Well, just answer my question. Don't try to analyze it too deeply.

THE COURT: Just lay back and enjoy it.

THE WITNESS: The questions are getting rather long also.

BY THE WITNESS:

A You want to know, was there a manually-controlled -- what do you want to call it -- manually-controlled what? Symbol?

BY MR. ANDERSON:

Q Well, I like "hitting symbol".

A Manually-controlled hitting symbol. And there was, of course, in the pool games --

Q That is movable during the play of the game, in contrast to pressing a button, sitting back and watching.

A Well, now, when did the game begin, sir? I feel that the game is really kind of moot here.

Here you are. You are invited by your friend to play the game. You come up and he says, "Here, take this knob and start twisting it and adjust your cue stick in here and take the angle you want. It's kind of interesting, you know."

I think the play of the game began then.

Q Okay. Let's take the case where the ball is -- one or more balls are moving, and assume that's the period --

A No, the player cannot intervene in Michigan pool.

Q Cannot intervene in any way?

A That's right.

Q He has to sit back and watch until all the balls came to a stop?

A But if you consider the game as continuous

from the time that he comes up and he starts twiddling the knobs until the time that he has sunk the cue ball, unfortunately, many times you could say that the game was continuing and he did have a chance to move it again during the play of the game.

THE COURT: It is 4:30. If you are desirous of going another five minutes to finish this up, it's all right with me.

MR. ANDERSON: I don't think I could finish with this witness in five minutes.

THE COURT: I know that. With this particular subject, if you want to.

MR. ANDERSON: No, I think we can easily adjourn at this time.

I might ask if Mr. Goldenberg has much more of his case when he finishes with Mr. Holt, just for planning purposes.

MR. GOLDENBERG: Mr. Holt is our last witness, your Honor. I think we will be resting on the completion of Mr. Holt's examination.

THE COURT: All right.

MR. ANDERSON: We may have short rebuttal, I would say an hour perhaps, and I am not certain at this time exactly what.

THE COURT: All right. Well, ideally what I

would like to do is complete both the evidence and the argument.

MR. ANDERSON: I think both Mr. Goldenberg and I feel that is possible.

MR. GOLDENBERG: We think it's possible.

MR. ANDERSON: We are prepared to stipulate to keeping our final argument very short, as short as possible.

THE COURT: Well, when the evidence is over I will tell you those things that are on my mind primarily, so that you can address yourselves to those, if you like, as well as anything else that you feel I should hear.

Holt - cross

I have not read these depositions yet that reference is made to because I am waiting for the counter designations.

MR. GOLDENBERG: Yes, sir, and I will have those Monday morning.

THE COURT: Monday, all right.

Let's plan then to reconvene at 10:00 o'clock on Monday morning.

MR. ANDERSON: That is fine.

THE COURT: It might make more sense to -- well, let's make it 10:00 o'clock.

MR. ANDERSON: Thank you, your Honor.

MR. GOLDENBERG: Thank you.

(Whereupon the trial of the above-entitled cause was adjourned until Monday, January 10, 1976 at 10:00 o'clock a.m.)